

What is claimed is:

1. A method of manufacturing an oxide thin film,
wherein a supercritical fluid is used as a medium.
- 5 2. A method of manufacturing a ferroelectric thin film,
wherein a mixture obtained by dissolving elements of oxide ferroelectric in a
supercritical fluid is used as a raw material.
- 10 3. A method of manufacturing a ferroelectric thin film,
wherein bubbles are dissolved in amorphous ferroelectric, and then the
amorphous ferroelectric is crystallized.
- 15 4. The method of manufacturing a ferroelectric thin film as defined in claim 3,
wherein the bubbles are formed from supercritical fluid.
5. A method of manufacturing a ferroelectric thin film,
wherein a low-solubility element is dissolved in a supercritical fluid, and then
the dissolved product is added to a ferroelectric raw material.
- 20 6. A method of manufacturing a ferroelectric thin film,
wherein a supercritical fluid pressurized at a pressure ranging from a
supercritical pressure to four times the supercritical pressure is used as a solvent.
- 25 7. The method of manufacturing a ferroelectric thin film as defined in any one of
claims 2, 3, 5 and 6,
wherein a ferroelectric thin film is selectively grown only in a desired region by

utilizing difference in characteristics of a material of a previously-patterned substrate.

8. The method of manufacturing a ferroelectric thin film as defined in any one of claims 2, 3, 5 and 6,

5 wherein a ferroelectric thin film is selectively grown only in a desired region by utilizing difference in surface energy of a previously-patterned substrate.

9. The method of manufacturing a ferroelectric thin film as defined in any one of claims 2, 3, 5 and 6,

10 wherein a ferroelectric thin film is selectively grown only in a desired region by utilizing difference in surface state of a previously-patterned substrate.

10. The method of manufacturing a ferroelectric thin film as defined in any one of claims 2, 3, 5 and 6,

15 wherein a ferroelectric thin film is formed only on an electrode metal.

11. A method of manufacturing a ferroelectric thin film,
wherein a solvent obtained by dissolving a sol-gel solution including ferroelectric elements in a supercritical fluid is used.

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12. A method of manufacturing a ferroelectric thin film,
wherein a solution obtained by dissolving an oxide including ferroelectric elements in a supercritical fluid is used.

25 13. A method of manufacturing a ferroelectric thin film,
wherein a gas-liquid substance obtained by dissolving an oxide including ferroelectric elements in a supercritical fluid is used.

14. A method of manufacturing a ferroelectric thin film,
wherein a gas obtained by dissolving an oxide including ferroelectric elements
in a supercritical fluid is used.

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15. A method of manufacturing a ferroelectric thin film,
wherein one of H₂, N₂, Xe, CO₂, C₂H₆, CH₃OH₂, NH₃ and H₂O is used as the
supercritical fluid as defined in any one of claims 1, 2, 5 and 6 and 11 to 14.

10 16. A ferroelectric thin film which has a perovskite structure and is manufactured by
the method as defined in any one of claims 1 to 15.

17. A ferroelectric thin film which has a bismuth-layered structure and is
manufactured by using the method as defined in any one of claims 1 to 15.

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18. A ferroelectric memory device comprising the ferroelectric thin film as defined
in claim 16 or 17.

19. A ferroelectric piezoelectric device comprising the ferroelectric thin film as
20 defined in claim 16 or 17.